

log# M-332 B



National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

Date: November 6, 1987

In reply refer to: M-87-102 through -104

Mr. William R. Saul
President
Steuart Transportation Company
Lighthouse Road
Piney Point, Maryland 20674

On December 20, 1986, the U.S. tank barge STC 410 was berthed at the Steuart Petroleum Company (SPC) facility pier at Piney Point, Maryland. Barge tanks Nos. 1, 3, and 5 were being vacuumed or stripped of residual JP-4 jet fuel that was being loaded into a tank truck located on the pier astern of the barge. About 0230, while the vacuuming crew was at the No. 5 tanks and almost completed with vacuuming, an explosion occurred within the No. 5 tanks. The barge tankerman and three persons working on the barge were killed, and a pier gauger located on the pier was injured. The explosion destroyed the after end of the barge from the transverse bulkhead of the No. 4 tanks to the stern and ruptured petroleum pipelines on the pier. A fire ensued that was fueled by petroleum products running out of the ruptured pipelines. The explosion and fire damaged the after end of the barge, a portion of the T-pier, and three vehicles on the pier. The explosion blast caused damage to nearby buildings on shore. Estimated damages to the barge, the pier, vehicles, and nearby facilities exceeded \$2 million. 1/

When the explosion occurred, the pier gauger was thrown from the pier shack onto the pier. Dazed and injured, he attempted to go toward shore along the main stem of the T-pier; however, that route was blocked by fire. He then crawled to the downriver end of the T-wing, acquired a lifering, and attempted to swim to the land spit only a short distance away. However, he was unable to get to the land spit because of the river current so he returned to the pier. Because it was nighttime, the pier gauger could not be seen easily in the water.

When the firefighters arrived at the pier, they initially were occupied with attacking the fire. Had the Steuart Transportation Company (STC) transportation specialist not walked along the beach and not heard the pier gauger calling for help, there could have been a significant delay in his rescue. Although a U.S. Coast Guard boat searched the waters for survivors and victims in the vicinity of the pier, the boat did not arrive at the pier until 0315, or 45 minutes after explosion. By then, the gauger had already been rescued.

The lack of a boat in the vicinity of the pier resulted in an unnecessary delay in rescuing the gauger. Had the gauger been more seriously injured or had the water and air temperatures been colder, he might not have survived.

1/ For more detailed information, read Marine Accident Report--"Explosion and Fire Aboard the U.S. Tank Barge STC 410, Steuart Petroleum Company Facility, Piney Point, Maryland, December 20, 1986" (NTSB/MAR-87/09).

The Safety Board has been concerned about the need for alternate escape routes from tank vessels moored at waterfront facilities and has addressed the subject in a number of accident reports. 2/ Long T-piers have increased the hazards when crews are forced to leave vessels rapidly in an emergency.

In consideration of the STC 410 accident, the Safety Board believes waterfront facilities should include in their contingency plans some consideration for alternate means of evacuation from piers when normal egress is not possible. In this instance, had the contingency plan provided for a boat to be available at or near the foot of the pier, the injured pier gauger could have been rescued more quickly and received earlier medical attention.

Matches and lighters were found at the barge site. Three of the persons on board the barge at the time of the explosion were identified as smokers--the barge supervisor, the senior gauger, and the tankerman. All three were experienced in the operations being conducted and were, or should have been, aware of the hazards of smoking on tank ships and tank barges. Company policy prohibited smoking and the use of "strike anywhere" matches except in areas established as smoking areas. Also, precautionary signs warning against smoking and the use of open lights were adequately posted in the vicinity. These prohibitions and precautionary warnings did not specify that matches, lighters, and smoking materials could not be carried into the areas. However, the employees should have been aware, through the SPC indoctrination program, of the flammable properties of JP-4.

Beer cans were recovered from the barge. The autopsies showed that the remains of the senior gauger and the tankerman contained low levels of alcohol content which were unlikely to have been sufficient to affect the motor skills required for the individuals to perform their duties, or to affect their ability to perceive a potentially dangerous situation. It is possible that having nearly completed the vacuuming of the barge, some of the persons on the barge may have been drinking beer. The tendency for persons who smoke to do so while drinking is quite common. Consequently, the smokers may have relaxed their normal precautions and decided to have a smoke. Although, lighting a cigarette or a pipe could have ignited a flammable vapor cloud from JP-4 cargo in the vicinity of the open hatches and could have caused the explosion, the Safety Board could not positively establish that the use of matches or lighters was the source of ignition in this accident. However, the Safety Board believes that unscheduled inspections should be conducted to deter persons working on the piers and tank vessels from carrying matches, lighters, and smoking materials; from drinking alcoholic beverages in those areas; and from violating other safety precautions.

The vacuuming truck had been used for several years for tank barge vacuuming, and the persons assigned to do the vacuuming were experienced. Operating instructions for the vacuuming procedure were not found after the accident. However, there is no evidence that the vacuuming crew had not conformed with them. The grounding wire that

2/ Marine Accident Reports--"M/T ELIAS, Explosion and Fire at the Atlantic Richfield Company Fort Mifflin Terminal, Delaware River, Pennsylvania, April 9, 1974" (NTSB-MAR-78-4); "Liberian Tank Vessel M/V SEATIGER, Explosion and Fire, Sun Oil Terminal, Nederland, Texas, April 19, 1979" (NTSB-MAR-80-18); "Explosion and Fire on Board the SS CHEVRON HAWAII with Damages to Barges and to the Deer Park Shell Oil Company Terminal, Houston Ship Channel, September 1, 1979" (NTSB-MAR-80-18); "Explosion Aboard the U.S. Tank Barge TTT 103, Pascagoula, Mississippi, July 31, 1986" (NTSB/MAR-87/05); and "Fires on Board the Panamanian Tankship SHOUN VANGUARD and the U.S. Tank Barge HOLLYWOOD 3013, Pascagoula, Mississippi, July 31, 1986" (NTSB/MAR-87/08).

normally was used to ground the truck before vacuuming the barge tank was found in its retracted position after the accident. Whether the grounding wire was properly grounded before the crew began to vacuum the tanks could not be established in the investigation. Since the grounding wire is simply spring-clipped into position, it could have been disconnected easily, or it could have made poor electrical contact. If that were the case, then the wire reinforced hose and the camlock fitting may have been at a different electric potential from the vessel hull. Because of the high resistance of the plastic polyvinyl chloride (PVC) wand, accumulation of a static charge was possible. However, based on the International Safety Guide for Oil Terminals and Tankers, it would have taken a loading rate in excess of 2,000 gallons per hour for the nonconducting PVC wand to have accumulated a static charge generated from the flow of the JP-4 through the wand while, based on the estimated amount of residual product collected, the flow rate during the vacuuming operation was calculated to be less than 1,500 gallons per hour. However, contamination by water and residues may have existed, causing a significant static charge to have been generated even at the lower flow rate. If the potential, due to static accumulation, was large enough, an incendive static discharge could have occurred when the camlock fitting was brought close to the side of the hatch coaming. To prevent a potential accident, vacuuming crews should use a wand which is constructed of conductive material with a low propensity to spark on impact, which is electrically bonded to the vacuuming hose, and which can be attached to the vessel when the wand is being used.

Therefore, the National Transportation Safety Board recommends that the Stuart Transportation Company:

Maintain a boat at the Piney Point facility that is suitable for the rapid recovery of persons who may become isolated on tank vessels or the pier and when normal egress from the vessel or pier is not possible because of damage or fire. (Class II, Priority Action) (M-87-102)

Establish a program of unscheduled inspections during tank vessel loading and discharge operations to check that safety precautions are properly observed. (Class II, Priority Action) (M-87-103)

Require that the vacuuming crew use a wand which is made of a conductive material with a low propensity to spark on impact, which is electrically bonded to the vacuuming hose, and which can be attached to the vessel when the wand is being used. (Class II, Priority Action) (M-87-104)

Also, the Safety Board issued Safety Recommendations M-87-95 and -96 to the U.S. Coast Guard, M-87-97 through -101 to the Stuart Petroleum Company, and M-87-105 to the American Petroleum Institute.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility ". . . to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations M-87-102 through -104 in your reply.

BURNETT, Chairman, and LAUBER, NALL, and KOLSTAD, Members, concurred in these recommendations. GOLDMAN, Vice Chairman, did not participate.


By: Jim Burnett
Chairman